

REMARKS

Claims 1-27, 29-49, 51-69 and 71-78 are pending, with claims 1, 12, 22, 34, 45, 53 and 64 being independent. Claims 7, 17, 27, 42, 49, 59 and 69 have been cancelled by this amendment without prejudice. Claims 1, 9, 10, 12, 18-20, 22, 30, 31, 34, 43-45, 52, 53, 61, 62, 64, 72, 73 and 76 have been amended. No new matter has been added. Reconsideration and allowance of the above-referenced application are respectfully requested.

Rejections Under 35 U.S.C. §§ 102 & 103

Claims 1, 2, 9-12, 17-24, 26, 30-35, 43-46, 52, 54, 61-66, 68 and 72-78 stand rejected under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. Pat. No. 7,136,244 to Rothberg. Claims 3-8, 13-18, 25, 27, 29, 36-42, 47-49, 51, 55-60, 67, 69 and 71 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Rothberg as applied to claim 1, and further in view of U.S. Pat. No. 6,519,715 to Takashi et al. (hereinafter Takashi). Independent claims 1, 12, 22, 34, 45, 53 and 64 have been amended to include the subject matter of cancelled claims 7, 17, 27, 42, 49, 59 and 69, respectively.

Independent claim 1 now recites, among other things, “an error correction circuit responsive to the detector and the averaging circuit to provide a signal quality metric that governs which signals are averaged.” (Emphasis added.) For example, as described in the present specification:

[0024] A quality monitor can be used to measure signal quality for use in reading the data. The quality measure can be based on a defined signal characteristic.

Averaging can be based on the quality measure, such as by excluding a read

signal with a low quality measure from the averaging, or such as by performing weighted averaging, where the weights are given by the quality measure. [...]

[0038] The signals that are averaged can vary. [...] obtained signals can be excluded from the averaging based on a signal quality metric[.]

(See Specification at ¶s 24 and 38; emphasis added.)

The Office Action relies on Takashi for this claimed subject matter, referring to FIG. 35, reference character (13) in Takashi when rejecting claim 7. (See 6-20-2007 Office Action at page 8.) However, Takashi fails to describe the claimed subject matter. Takashi focuses on reducing latency and teaches reading a disk again by doing a synchronized addition to the same sector. (See Takashi at col. 27, lines 45-59.) Takashi automatically reads the disk when the sector comes around again and automatically averages the new read signal with the stored read signal to reduce signal to noise ratio. The cited portion of Takashi describes a maximum likelihood (ML) detector circuit 13 that interprets this averaged signal:

Sampled data from the pertinent sector is previously stored in FIFO 6. Specifically, as can be seen from FIG. 36, signal of the pertinent sector is obtained at each time, because the media 54 has rotated constantly. A sector signal recorded on a track is stored as sampled data in FIFO 6 through AD circuit 4 to AGC circuit 12. Next, when media 54 makes one turn and the signal of the same sector are reproduced, average circuit 250 calculates an average of current data coming from AGC circuit 12 and the sampled data of the previous read operation in FIFO 6. The average operation is started after sync byte data, therefore, the operation is conducted as a synchronized addition for the same sector. Namely, without changing the signal amplitude, only noise superimposed onto the signal is attenuated by a square root of 1/2. As a result, the signal-to-noise ratio of the sampled data supplied to ML detector circuit 13 is improved

only 3 dB. That is, it is possible to reproduce signals having a lower signal-to-noise ratio.

(*See* Takashi at col. 27, lines 46-63; emphasis added.) Nothing here teaches or suggests an error correction circuit responsive to the detector and the averaging circuit to provide a signal quality metric that governs which signals are averaged.

Thus, independent claim 1 should be in condition for allowance. Dependent claims 2-6, 8 and 11 should be allowable based at least on their dependence from an allowable base claim.

Independent claim 12 should be allowable for at least similar reasons. Claim 12 now recites, among other things, “an error correction circuit responsive to the detector and the averaging circuit to provide a signal quality metric that governs which read signals are averaged.” (Emphasis added.) The Office Action relies on Takashi for this claimed subject matter, referring to the rejection of claim 7 when rejecting claim 17. (*See* 6-20-2007 Office Action at page 8.) Thus, the remarks above with respect to Takashi are applicable to claim 12 as well.

In addition, it is noted that claim 17 stands rejected under 35 U.S.C. 102(e) over Rothberg. However, no basis is provided for this rejection; thus the inclusion of claim 17 in the listing of the claims rejected under 35 U.S.C. 102(e) is presumed to be in error. Moreover, Rothberg makes clear that each new signal is averaged into a running average of all previous signals from the same data sector:

The binary bits 26 detected during the read operation are averaged with the binary bits stored in the buffer 10 to generate averaged binary bits. The disk controller 12 processes the averaged binary bits stored in the buffer 10 in an attempt to recover the data sector. If the data sector is still unrecoverable, another retry operation is executed and the detected binary bits 26 are averaged with the binary bits stored

in the buffer 10. This process is reiterated until the data sector is recovered, or the data sector is deemed unrecoverable after a predetermined number of retries.

(See Rothberg at col. 3, lines 57-67; emphasis added.) Thus, Rothberg fails to teach or suggest an error correction circuit responsive to the detector and the averaging circuit to provide a signal quality metric that governs which read signals are averaged.

Thus, independent claim 12 should be in condition for allowance. Dependent claims 13-16, 18 and 21 should be allowable based at least on their dependence from an allowable base claim.

Independent claim 22 should also be allowable for at least reasons similar to claim 1. Claim 22 now recites, among other things, “wherein interpreting the input signal comprises using maximum likelihood detection and error correction to provide the discrete values and a signal quality metric, the method further comprising excluding the input signal from the multiple signals to be averaged based on the signal quality metric.” (Emphasis added.) The Office Action relies on Takashi and the rejection of claim 8, for this claimed subject matter, referring to the rejection of claim 8 when rejecting claim 27. (See 6-20-2007 Office Action at page 9.) However, claim 8 does not include the claimed subject matter of “excluding the input signal from the multiple signals to be averaged based on the signal quality metric.” Thus, an element of the claim has not been addressed in the current rejection.

For at least reasons similar to those addressed above, neither Rothberg nor Takashi teaches or suggests excluding the input signal from the multiple signals to be averaged based on a signal quality metric. Thus, independent claim 22 should be in condition for allowance.

Dependent claims 23-26, 29 and 33 should be allowable based at least on their dependence from an allowable base claim.

Independent claim 34 should also be allowable for at least reasons similar to claim 1.

Claim 34 now recites, among other things, “wherein the means for reading further includes error-detection means for controlling which read signals are averaged.” (Emphasis added.) The Office Action relies on Takashi for this claimed subject matter, referring to the rejection of claim 7 when rejecting claim 42. (*See* 6-20-2007 Office Action at page 8.) Thus, the remarks above with respect to Takashi and Rothberg are applicable to claim 34 as well, and independent claim 34 should be in condition for allowance. Dependent claims 35-41 should be allowable based at least on their dependence from an allowable base claim.

Independent claim 45 should also be allowable for at least reasons similar to claim 17.

Claim 45 now recites, among other things, “wherein the means for interpreting comprises maximum likelihood detection and error correction means for providing the discrete values and a signal quality metric used to exclude an input signal from averaging.” (Emphasis added.) The Office Action relies on Takashi and the rejection of claim 8, for this claimed subject matter, referring to the rejection of claim 8 when rejecting claim 49. (*See* 6-20-2007 Office Action at page 9.) However, claim 8 does not include the claimed subject matter of “a signal quality metric used to exclude an input signal from averaging.” Thus, an element of the claim has not been addressed in the current rejection.

For at least reasons similar to those addressed above, neither Rothberg nor Takashi teaches or suggests a signal quality metric used to exclude an input signal from averaging. Thus,

independent claim 45 should be in condition for allowance. Dependent claims 46-48, 51 and 78 should be allowable based at least on their dependence from an allowable base claim.

Independent claim 53 should also be allowable for at least reasons similar to claim 1. Claim 53 now recites, among other things, “means for providing a signal quality metric that **governs which signals are averaged.**” (Emphasis added.) The Office Action relies on Takashi for this claimed subject matter, referring to the rejection of claim 7 when rejecting claim 59. (See 6-20-2007 Office Action at page 8.) Thus, the remarks above with respect to Takashi and Rothberg are applicable to claim 53 as well, and independent claim 53 should be in condition for allowance. Dependent claims 54-58, 60 and 63 should be allowable based at least on their dependence from an allowable base claim.

Independent claim 64 should also be allowable for at least reasons similar to claim 45. Claim 64 now recites, among other things, “wherein interpreting the input signal comprises using maximum likelihood detection and error correction to provide the discrete values and a signal quality metric, and the operations further comprise **excluding the input signal from the multiple signals to be averaged based on the signal quality metric.**” (Emphasis added.) The Office Action relies on Takashi and the rejection of claim 8, for this claimed subject matter, referring to the rejection of claim 8 when rejecting claim 69. (See 6-20-2007 Office Action at page 9.) However, claim 8 does not include the claimed subject matter of “excluding the input signal from the multiple signals to be averaged based on the signal quality metric.” Thus, an element of the claim has not been addressed in the current rejection.

For at least reasons similar to those addressed above, neither Rothberg nor Takashi teaches or suggests excluding the input signal from the multiple signals to be averaged based on

the signal quality metric. Thus, independent claim 64 should be in condition for allowance.

Dependent claims 65-68, 71 and 75 should be allowable based at least on their dependence from an allowable base claim.

Claims 9, 19, 30, 43, 52, 61 and 72 stand rejected under 35 U.S.C. 102(e) in view of Rothberg, and each of these claims have been amended to be in independent form. The Office refers to FIG. 1B, reference characters (20) & (22) in Rothberg when rejecting these claims. (See 6-20-2007 Office Action at page 4.) However, Rothberg fails to describe the claimed subject matter. As described in Rothberg:

As shown in the flow diagram of FIG. 1B, at step 14 the disk controller 12 positions the head 8 over a selected data sector to generate a first read signal and at step 16 stores in the buffer 10 first read data associated with the first read signal. If at step 18 a read error occurs, the disk controller 12 repositions the head over the selected data sector at step 19 to generate a second read signal. At step 20 second read data associated with the second read signal is averaged with the first read data stored in the buffer 10 to generate averaged read data. The average read data is stored in the buffer 10 and processed at step 22 to recover the selected data sector.

[...] If the data sector is still unrecoverable, another retry operation is executed and the detected binary bits 26 are averaged with the binary bits stored in the buffer 10. This process is reiterated until the data sector is recovered, or the data sector is deemed unrecoverable after a predetermined number of retries.

(See Rothberg at col. 3, lines 32-67; emphasis added.) Thus, Rothberg teaches assessing a read error based on the original signal or a later averaged signal.

In contrast, the subject matter of claim 9 includes, “wherein the control circuit determines whether the discrete values are adequately indicated based on comparison of interpretations of

the new averaged signal and the current signal.” (Emphasis added.) For example, as described in the Specification:

[0023] Determining whether the discrete values are adequately indicated can involve comparing interpretations of the averaged read signal and a current read signal. [...]

[0039] Determining whether the discrete values are adequately indicated based on the averaged signal can involve different types of comparisons. The averaged signal can be interpreted directly, and the determination can be based solely on the interpreted averaged signal. Alternatively, the determination can involve a comparison of interpretations of the averaged signal and of the current signal.

(See Specification at ¶s 23 and 39; emphasis added.) Rothberg fails to teach or suggest this subject matter, as recited in independent claims 9, 19, 30, 43, 52, 61 and 72. Thus, these claims should be in condition for allowance. Dependent claims 10, 20, 31, 32, 44, 62, 73, 74, 76 and 77 should be allowable based at least on their dependence from an allowable base claim.

CONCLUSION

The foregoing comments made with respect to the positions taken by the Examiner are not to be construed as acquiescence with other positions of the Examiner that have not been explicitly contested. Accordingly, the above arguments for patentability of a claim should not be construed as implying that there are not other valid reasons for patentability of that claim or other claims.

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In view of the remarks herein, claims 1-6, 8-16, 18-26, 29-41, 43-48, 51-58, 60-68 and 71-78 should be in condition for allowance. A formal notice of allowance is respectfully requested.

Please apply the \$1400 excess claims fee, and any other necessary charges or credits, to deposit account 06-1050.

Respectfully submitted,

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